

NUCLEAR ATTACK PLANNING BASE - 1990

EXECUTIVE SUMMARY

PROJECT OVERVIEW

The NAPB-90 project was an in-house project of the Federal Emergency Management Agency (FEMA) carried out over a year and a half from early 1985 to 1986. The project was coordinated by the Office of Emergency Management Programs, State and Local Programs and Support Directorate, and involved professionals and experts from FEMA directorates and offices, other Federal departments and agencies, and the private sector.

The NAPB-90 is an estimate of the potential physical effects of a nuclear attack on the population of the United States in terms of the degree of the potential risk.

Three types of potential nuclear attack effects risks and the areas and populations affected by each are defined:

- The direct effects risk from blast overpressure generated by the explosion of a nuclear weapon;
- The potential thermal and secondary blast-ignited fire risk created by the combined effects of blast overpressure damage and the thermal pulse or fireball of a weapon; and
- The fallout risk from radiation generated by surface-burst weapons.

The development of the planning base followed detailed studies of all aspects of nuclear attack planning, but despite such efforts specific confidence limits cannot be assigned to either implicit or explicit assumptions used regarding targeting, weapon yields and designs, heights of burst, and delivery system accuracy and reliability. In short, NAPB-90 does not (and cannot) claim total realism.

PROJECT DEVELOPMENT

An initial study of Soviet military objectives, war-fighting scenarios, targeting strategies, and force applications provided the basis for many of the developmental procedures and policies of NAPB-90. In the development of the target base, for example, close attention was paid to frequent Soviet references to damage limitation strategies, particularly those involving non-target resources of the enemy. This element significantly influenced procedures used in making final possible enemy target selections.

NAPB-90 is a scenario-independent study since Soviet targeting priorities (as well as their strategic objectives) remain essentially the same regardless of the a priori scenario under which their weapons would be employed.

All of the NAPB-90 targets were developed and carefully edited to conform to both Soviet-declared strategic objectives and force deployment principles. Initial and subsequent iterations of the target base were compared against listings of projected 1990 Soviet strategic nuclear forces in order to assure logical weapon employments. All aim points finally selected were attacked using Soviet strategic targeting procedures to assure realistic weapon employment. In this respect, the following targeting factors were used in weapon selection and employment:

- The height of weapon detonation representing the height which would be selected by the Soviet strategic planner for weapon detonation;
- The Soviet views regarding expected surface characteristics of selected U.S. targets which would influence the extent of blast overpressures generated;
- The vulnerability of U.S. targets to blast overpressures assumed by the Soviet planner; and
- The probability of damage or destruction of the target influenced by the accuracy of the Soviet weapon and its probability of arrival on target.

In short, all Soviet weapons were employed as if by a Soviet strategic planner. Thus, NAPB-90 is not a "mirror-image" attack in which weapons and targets are chosen from a U.S. point of view.

RISK DEFINITIONS

Direct Effects - NAPB-90 defined the potential risk from nuclear weapon blast Overpressures as the total area affected by 0.5 pound per square inch (psi) or more. This represents 727,112 square miles of the U.S. with an estimated resident population of 175.1 millions. Since NAPB-90 does not target population per se, the persons affected by blast overpressures reside in areas which are peripheral to or collocated with potential military and industrial targets.

Four degrees of the potential risk from blast overpressure were delineated, based on the severity of short-term threat from the blast wave itself and its potential to kill or injure; the potential long-term severity to survivors within the blast area; and the kind, degree and practicality of in-place and/or crisis-general measures necessary for protection.

- Very High Direct Effects Risk Areas were defined as areas surrounding target aim points which have the potential to experience blast overpressures equal to or greater than 10.0 psi from a nuclear detonation(s). Approximately 47.2 million persons (19 percent of the population) reside in Very High Direct Effects Risk Areas which cover approximately 46,352 square miles.
- High Direct Effects Risk Areas were defined as areas around a target aim point which have the potential to experience blast overpressures from a nuclear weapon detonation of equal to or greater than 5.0 psi

but less than 10.0 psi. Approximately 32.2 million persons (13 percent of the population) reside in High Direct Effects Risk Areas which cover approximately 49,896 square miles.

- Medium Direct Effects Risk Areas were defined as areas around target aim point which have the potential to experience blast overpressures from a nuclear weapon detonation(s) of equal to or greater than 2.0 psi but less than 5.0 psi. Approximately 50.3 million persons (21 percent of the population) reside in Medium Direct Effects Risk Areas which cover approximately 151,535 square miles.
- Low Direct Effects Risk Areas were defined as areas around target aim point which have the potential to experience blast overpressures from a nuclear weapon detonation(s) of equal to or greater than 0.5 psi but less than 2.0 psi. Approximately 45.4 million persons (19 percent of the population) reside in Low Direct Effects Risk Areas which cover approximately 479,329 square miles.

In sum, approximately 72 percent of the U.S. population is potentially affected by blast overpressures 0.5 psi or more, with 67 million persons living outside the total area defined as at direct effects risk.

Fallout Risk - The potential risk from fallout radiation generated by ground-burst weapons is vast and far-reaching. NABP-90 defined the entire continental U.S. as under this potential risk, basing its risk assessment on the potential effect of fallout radiation on the resident population over a period of one week following the deposition of fallout and the efficacy of shelter protection to mitigate such exposure. Longer-term effects (additional cancer deaths and potential death in future progeny) were also considered.

To determine risk levels for U.S. counties, NABP-90 employed the combined results of 12 "most-likely" wind patterns--one such pattern for each month of the year--and used the highest resulting radiation effect in each county as its potential risk level.

Four levels of potential fallout risk were defined:

- Very High Fallout Risk Counties were defined as those which have the potential to receive a one-week unprotected radiation dose of equal to or greater than 15,000 roentgens (R). The counties which were defined at this risk level have resident populations totaling 9.6 millions (4 percent of the U.S.) and cover approximately 421,669 square miles.
- High Fallout Risk Counties were defined as those which have the potential to receive a one-week unprotected radiation dose of equal to or greater than 6,000 roentgens but less than 15,000 roentgens. The counties which were defined at this risk level have resident populations totaling 49.2 millions (20 percent of the U.S.) and cover approximately 624,407 square miles.

- ° Medium Fallout Risk Counties were defined as those which have the potential to receive a one-week unprotected radiation dose of equal to or greater than 3,000 roentgens but less than 6,000 roentgens. The counties which were defined at this risk level have resident populations totaling 62.6 millions (26 percent of the U.S.) and cover approximately 618,811 square miles.
- ° Low Fallout Risk Counties were defined as those which have the potential to receive a one-week unprotected radiation dose of less than 3,000 roentgens. The counties which were defined at this risk level have resident populations totaling 120.8 millions (50 percent of the U.S.) and cover approximately 1,886,339 square miles.

NAPB-90 does not recommend the types and degree of shelter protection best suited to the individual fallout risk areas, but rather delineates the short and long-term consequences of selecting shelter of varying quality, stressing that the ultimate aim is "zero exposure."

Fire Risk - The risk of potential thermal and secondary blast-ignited fires created is directly related to the risk from blast overpressures. Hence, NAPB-90 defined the fire risk as coexistent with that risk, delineating three degrees of risk:

- ° Very High Fire Risk Areas exist where blast overpressures equal or exceed 5.0 psi, that is, the areas defined as at very high and high direct effects risk. Survivors in these areas would almost certainly perish should any fires occur since search and rescue, evacuation, and fire fighting are considered almost impossible to accomplish.
- ° High Fire Risk Areas exist where blast overpressures are greater than 2.0 psi but less than 5.0 psi, that is, the areas defined as at medium direct effects risk. The characteristics of damage created by this range of overpressure (generally standing but heavily damaged buildings) are conducive to the generation and spread of mass fires. As in the Very High Fire Threat Area, emergency operations to assist survivors as well as to control or extinguish fires are almost impossible to accomplish.
- ° Medium Fire Risk Areas comprise the remainder of the area of potential blast overpressure, that is, the area experiencing equal to 0.5 psi but less than 2.0 psi. While blast-induced fires are less likely at this range of overpressure, thermal ignitions remain a distinct hazard, particularly when such ignitions occur indoors.